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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 10/797,422
Applicant : ACKERMAN, *et al.*
Filed : MARCH 10, 2004
Title : THERMAL BARRIER COATING PROTECTED BY INFILTRATED ALUMINA
AND METHOD FOR PREPARING SAME

Art Unit : 1762
Examiner : TUROCY, DAVID P.

Atty Docket No. : 122802-3

Mail Stop: Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The below-identified communication(s) is (are) submitted in the above-captioned application or proceeding:

Reply Brief (17 pages); and
 Amendment Fee Transmittal and Authorization to Charge Deposit Account (1 page).
 The Commissioner is hereby authorized to charge payment of any fees associated with this communication, including fees under 37 C.F.R. §§ 1.16 and 1.17 or credit any overpayment to **Deposit Account Number 10-0233-GEAE-0011-DV1**.

Respectfully submitted,

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September 7, 2006

Patent Fee Transmittal for FY 2006

Applicant(s) Claims Small Entity Status 37 C.F.R. 1.27

TOTAL AMOUNT OF PAYMENT

\$0.00

SEP 07 2006
U.S. PATENT & TRADEMARK OFFICE

Application No.	10/797,422
Filing Date	March 10, 2004
Named Inventor	John F. ACKERMAN et al.
Examiner Name	TUROCY, David P.
Art Unit	1762
Attorney Docket No.	122802-3-GEAE-0011-DV1

FEE CALCULATION

1. Filing Fees

Application Type	Description	Large Entity		Small Entity		Paid
		Code	(\$)	Code	(\$)	
Utility	Basic	1011	300	2011	150	\$ -
	Examination	1311	200	2311	100	\$ -
	Search	1111	500	2111	250	\$ -
Design	Basic	1012	200	2012	100	\$ -
	Examination	1312	130	2312	65	\$ -
	Search	1112	100	2112	50	\$ -
Plant	Basic	1013	200	2013	100	\$ -
	Examination	1313	160	2313	80	\$ -
	Search	1113	300	2113	150	\$ -
Reissue	Basic	1014	300	2014	150	\$ -
	Examination	1114	600	2114	300	\$ -
	Search	1314	500	2314	250	\$ -
Provisional	Basic	1005	200	2005	100	\$ -
National Stage	Basic	1631	300	2631	150	\$ -
	Examination	1633	200	2633	100	\$ -
	Search	1632	500	2632	250	\$ -

2. Extra Claim Fee

a. Claims as Filed

	Extra Claims	Large Entity	Small Entity	Paid
Total Claims	0 - 20 =	0	x	1201 2201 25 \$ -
Independent	0 - 3 =	0	x	1202 2202 100 \$ -
Multiple Dependent		1203 2203 180		\$ -

b. Claims as Amended

	After Amnt	Highest Paid	Present Extra	Large Entity	Small Entity	Paid
Total Claims	19	21	*	0	x	1201 2201 25 \$ -
Independent	2	2	**	0	x	1202 2202 100 \$ -
First Presentation of Multiple Dependent				1203 2203 180		\$ -

* Less than 20, enter 20 ** Less than 3, enter 3

3. Extra Page Fee

Total Pages	Extra Pages	Large Entity	Small Entity	Paid
0 -100	0	x	1081 250 2081 125 \$ -	

Subtotal for Application Fees

1	\$ -	+	2	\$ -	+	3	\$ -	=	\$ -
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4. Additional Fees

Description	Large Entity	Small Entity	Code	(\$)	Code	(\$)	Paid
Extension for response first month	1251	120	2251	60	\$ -		
Extension for response second month	1252	450	2252	225	\$ -		
Extension for response third month	1253	1,020	2253	510	\$ -		
Extension for response fourth month	1254	1,590	2254	795	\$ -		
Extension for response fifth month	1255	2,160	2255	1,080	\$ -		
Notice of Appeal	1401	500	2401	250	\$ -		
Filing a Brief in Support of an Appeal	1402	500	2402	250	\$ -		
Request for Oral hearing	1403	1,000	2403	500	\$ -		
Petitions under 1.17(f)	1462	400	1462	400	\$ -		
Petitions under 1.17(g)	1463	200	1463	200	\$ -		
Petitions under 1.17(h)	1464	130	1464	130	\$ -		
Petition - public use proceeding	1451	1,510	1451	1,510	\$ -		
Petition to Revive - Unavoidable	1452	500	2452	250	\$ -		
Petition to Revive - Unintentional	1453	1,500	2453	750	\$ -		
Utility Issue Fee	1501	1,400	2501	700	\$ -		
Design Issue Fee	1502	800	2502	400	\$ -		
Plant Issue Fee	1503	1,100	2503	550	\$ -		
Reissue Issue Fee	1511	1,400	2511	700	\$ -		
Publication Fee	1504	300	1504	300	\$ -		
Statutory Disclaimer	1814	130	2814	65	\$ -		

(cont.)

Description (cont.)

	Code	(\$)	Code	(\$)	Paid
Recording each Assignment	8021	40	8021	40	\$ -
Submission of IDS	1806	180	1806	180	\$ -
Request for Cont. Examination (RCE)	1801	790	2801	395	\$ -
Filing Submission After Final	1809	790	2809	395	\$ -
Surcharge - late filing fee or oath	1051	130	2051	65	\$ -
Surcharge - late provisional fee	1052	50	2052	25	\$ -
Non-English Specification	1053	130	1053	130	\$ -
Processing Fee 37 CFR 1.17(q)	1807	50	1807	50	\$ -
Request for Ex Parte Reexamination	1812	2,520	1812	2,520	\$ -
Request Pub. of SIR prior to action	1804	920	1804	920	\$ -
Request Pub. of SIR after action	1805	1,840	1805	1,840	\$ -
Each Add. Invention Examined	1810	790	2810	395	\$ -
Expedited Examination (Design)	1802	900	1802	900	\$ -
Unintentionally Delayed Priority Claim	1453	1,370	1453	1,370	\$ -
Certificate of Correction	1811	100	1811	100	\$ -
Maintenance Fees 3.5 years	1551	900	2551	450	\$ -
Maintenance Fees 7.5 years	1552	2,300	2552	1,150	\$ -
Maintenance Fees 11.5 years	1553	3,800	2553	1,900	\$ -
Surcharge - Late Payment 6 mos.	1554	130	2554	65	\$ -
Other fee					\$ -

Additional Fee Subtotal 4 \$ -

METHOD OF PAYMENT (Check all that apply)

Credit Card (Provide credit card information and authorization on PTO-2038)
 Deposit Account No. **10-0233-122802-3-(GEAE-0011-DV1)**

For the above-identified deposit account, the Director is hereby authorized to:

To charge the above-identified fee.
 To charge any additional fees which may be required under 37 CFR 1.16, 1.17, 1.18, 1.20 and 1.492 or credit any overpayment to the deposit account number listed above.

Submitted by:

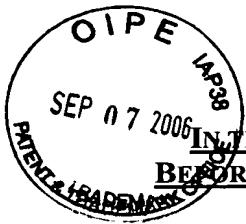
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Eric W. Guttag

September 7, 2006

Signature

Date



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application No. : 10/797,422
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APPELLANTS REPLY BRIEF UNDER 37 CFR 41.41(a)

Sir:

Appellants have received the Examiner's Answer mailed August 8, 2006, in response to Appellants Brief for the above application. Pages 3-9 of Section 9 (Grounds of Rejection) of the Examiner's Answer have been previously addressed at pages 4-15 of Appellants Brief. Appellants are timely submitting this Reply Brief solely in response to: (1) page 3 of Section 8 (Evidence Relied Upon); and (2) pages 9-17 of Section 10 (Response to Arguments) of the Examiner's Answer.

SUMMARY OF CLAIMED SUBJECT MATTER

For the Board's convenience, Appellants' claimed invention relates to a method for preparing a thermal barrier coating 22 protected by infiltrated alumina that overlies a metal substrate 14. This method comprises the steps of: (1) providing thermal barrier coating 22 overlaying metal substrate 14, where thermal barrier coating 22 includes porous outer layer 30 having exposed surface 34 and comprising a non-alumina ceramic thermal barrier coating material in an amount up to 100%; (2) treating porous outer layer 30 with liquid composition 38 comprising an alumina precursor to infiltrate porous outer layer 30 with the alumina precursor in an amount sufficient to provide, when converted to alumina, at least partial protection of thermal barrier coating 22 against environmental contaminants that become

deposited on exposed surface 34; and (3) converting in situ the infiltrated alumina precursor within porous outer layer 30 to alumina (see, for example, Claims 17 and 32). See paragraphs [0010] at page 4, [0032] at page 13 and paragraph [0034] at page 14 of the above application, as well as the drawing FIG.

Porous outer layer 30 may be formed on a bond coat layer 18 adjacent to and overlaying metal substrate 14 (see Claim 18). See paragraph [0022] at page 9 of the above application. Liquid composition 38 may comprise from about 5 to about 50% (more typically from about 10 to about 20%) alumina precursor (see Claims 19-20 and 33) which may be selected from aluminum alkoxides, aluminum β -diketonates, aluminum alkyls and alumina sols (see Claim 21-22 and 33-34). See paragraph [0029] at page 12 of the above application. Liquid composition 38 may be aqueous (see Claim 27 and 37) and may further comprise a polar organic liquid solvent (see Claim 28). See paragraph [0029] at page 12 of the above application.

Porous outer layer 34 may be treated with liquid composition 38 for a period of from about 0.1 to about 30 (more typically from about 1 to about 5) minutes (see Claims 29-30). See paragraph [0030] at pages 12-13 of the above application. The infiltrated alumina precursor may be heated (e.g., to a temperature of at least about 1200°F for a period of at least about 2 hours) to thermally convert the precursor to the alumina (see Claims 24-25 and 35), for example, as finely divided alpha-alumina (see Claims 26 and 36). See paragraph [0032] at page 13 of the above application. Porous outer layer 34 may also be treated with liquid composition 38 while the turbine component is in an assembled state (see Claims 32-37) and where the treated thermal barrier coating 22 is a refurbished thermal barrier coating (see Claim 38). See paragraph [0034] at page 14 of the above application.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

For the Board's convenience, there are three grounds of rejection to be reviewed on this appeal. The first ground of rejection is whether Claims 17-25, 27-30, 32-35 and 37 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent 5,324,544 (hereafter referred to as "Spence et al."), in view of U.S. Patent 5,871,820 (hereafter referred to as "Hasz et al."). The second ground of rejection is whether Claims 26 and 36 are unpatentable under 35 U.S.C. § 103(a) over Spence et al., in view of Hasz et al., and further in view of pages 11, and 752-53 from Volume 4 of the Engineered Materials Handbook (hereafter referred to as "Ceramics and

Glasses”). The third ground of rejection is whether Claims 32 and 38 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent 6,274,193 (hereafter referred to as “Rigney et al.”), in view of Spence et al., and in view of Hasz et al.

APPELLANTS’ RESPONSE TO SECTION 8 OF THE EXAMINER’S ANSWER

Section 8 (Evidence Relied Upon) at page 3 of the Examiner’s Answer refers to definitions of two words: (1) “impregnate” as defined by www.m-w.com/dictionary; and (2) “infiltrate” as also defined by www.m-w.com/dictionary.

Appellants must respectfully and strenuously object to the reliance in the Examiner’s Answer on the definitions of these two words according to the source www.m-w.com/dictionary. Only now in the Examiner’s Answer does the Examiner finally and tardily reveal the source of the definitions of these two words relied on in the Final Office Action and the Advisory Action. In fact, and as stated in Appellants Brief (see page 5), Appellants have repeatedly requested that the Examiner either provide a copy of these alleged definitions or indicate where Appellants might obtain such definitions on the Internet because the previous designation by the Examiner of “Webster’s online dictionary” did not adequately provide Appellants with sufficient information to understand or obtain these definitions, in violation of 37 CFR § 104(d)(1).

This extremely tardy revealing by the Examiner’s Answer of the source of these definitions after Appellants have repeatedly requested that the Examiner provide same without any appropriate response by the Examiner is grossly unfair and prejudicial to Appellants. In fact, this extremely tardy revealing by the Examiner’s Answer of the source of these definitions amounts to an improper effort to rely on “other evidence” not of record in this appeal, and in violation of 37 CFR § 41.39, as well as MPEP § 1207.02. Accordingly, the Board is again respectfully requested to give no absolutely weight to these alleged definitions from the indicated source in considering the Examiner’s Answer.

APPELLANTS’ RESPONSE TO SECTION 10 OF THE EXAMINER’S ANSWER

A. REJECTION OF CLAIMS 17-25, 27-30, 32-35 AND 37 UNDER 35 U.S.C. § 103(a) AS UNPATENTABLE OVER SPENCE ET AL., IN VIEW OF HASZ ET AL.

There are basically six points presented at pages 9-15 of Section 10 of the Examiner’s Answer that necessitate an additional response by Appellants regarding the rejection of

Claims 17-25, 27-30, 32-35 and 37 under 35 U.S.C. § 103(a) as unpatentable over Spence et al., in view of Hasz et al. These points relate to: (1) Appellants position that Spence et al. does not teach or suggest infiltrating the porous outer layer of the thermal barrier coating with an alumina precursor according to the method of Claims 17-25, 27-30, 32-35 and 37; (2) Appellants position that treating “infiltration” as being equivalent to “coating” is unsupportable based on the art relied on, even in view of the *In re Marra* case; (3) Appellants position that there is no properly alleged motivation for combining the teachings of Hasz et al. with those of Spence et al.; (4) Appellants position that, even if properly combinable with Spence et al., Hasz et al. still fails to teach or suggest that its deposited coating “infiltrates” the thermal barrier coating according to the method of Claims 17-25 27-30, 32-35 and 37; (5) Appellants position that Spence et al., even in view of Hasz et al., fails to teach or suggest the claimed period of time for treating the outer layer according to Claims 29-30; and (6) Appellants position that, contrary to 37 CFR 1.104(c)(2), the Final Office Action never specifically identifies where Spence et al. or Hasz et al. teach or suggest a turbine component that is in an assembled state according to Claims 32-35 and 37.

1. IN ARGUING THAT SPENCE ET AL. DOES NOT TEACH OR SUGGEST INFILTRATING THE POROUS OUTER LAYER OF THE THERMAL BARRIER COATING WITH AN ALUMINA PRECURSOR ACCORDING TO THE METHOD OF CLAIMS 17-25, 27-30, 32-35 AND 37, APPELLANTS HAVE PROPERLY POINTED OUT AN ADMITTED AND CONCEDED DEFICIENCY IN THE TEACHING OF SPENCE ET AL.

As was pointed out in Appellants Brief (see page 4) and as was conceded in the Final Office Action and the Advisory Action, Spence et al. does not teach or suggest infiltrating the porous outer layer of the thermal barrier coating with an alumina precursor according to the claimed method. See step (2) of Claims 17 and 30. Instead, Spence et al. teaches coating the fuel contacting surface of a metallic substrate/component with a thin, high temperature resistant layer of alumina and silica deposited from a sol-gel. See column 3, lines 17-22. Nowhere does Spence et al. teach or suggest that the deposited sol-gel infiltrates the fuel contacting surface of the metallic substrate/component, much less a porous outer layer of a thermal barrier coating as in the claimed method.

In response, page 9 of the Examiner’s Answer argues that while Spence et al. “teaches coating a metallic substrate/component with a thin layer using sol gel,” this reference “also

teaches applying the layer to bond coats and undercoats.” Page 9 of the Examiner’s Answer also argues that “the rejection is based on the combined teachings of Spence [et al.] and Hasz [et al.] and not the explicit teachings of Spence [et al.].”

Contrary to what the Examiner’s Answer suggests, Appellants are simply pointing out the admitted deficiencies in the teachings of Spence et al., the primary reference relied on in rejecting Claims 17-25, 27-30, 32-35 and 37. It is certainly proper for Appellants to point out these deficiencies in the primary reference, especially since the Final Office Action and the Advisory Action admit and concede that these deficiencies exist in Spence et al. In fact, this response at page 9 of the Examiner’s Answer still does not address where Spence et al. teaches or suggests that the deposited sol-gel infiltrates a porous outer layer of a thermal barrier coating as in the claimed method, or even an undercoat or bond coat as additionally referred to at page 9 of the Examiner’s Answer.

2. THE POSITION IN THE EXAMINER’S ANSWER THAT “INFILTRATION” IS EQUIVALENT TO “COATING” IS UNSUPPORTABLE, EVEN IN VIEW OF THE *IN RE MARRA* CASE.

As previously pointed out by Appellants in this Reply Brief, the Board should give absolutely no weight to the alleged definitions of “impregnate” and “infiltrate from the source www.m-w.com/dictionary. Even assuming (but not conceding) that these definitions can be relied on and are also correct for the two indicated terms, the Final Office Action, the Advisory Action, and now the Examiner’s Answer have alleged, in view of these objected to definitions, that: (1) “infiltrating” is synonymous with “impregnating;” and (2) in view of the *In re Marra* case there is allegedly no art recognized distinction between “coating” and “impregnating.”

Once again, the Examiner’s Answer suggests, by some strained logic, that the terms “coating” and “infiltrating” are equivalent. As Appellants have previously argued (see page 5 of Appellants Brief), the suggestion that the terms “coating” and “infiltrating” are somehow equivalent with regard to the method of Claims 17-25, 27-30, 32-35 and 37 is unsupportable in view of Spence et al and Hasz et al, and is certainly not supported by the *In re Marra* case.

Again, the *In re Marra* case involved a rejection of a claimed process for sizing paper by applying a coating composition comprising a ketene dimer to a cellulose paper web. One of the references (Keim et al.) relied on in this rejection taught the use of the claimed ketene dimer in sizing paper. The Board’s attention is once again respectfully directed to the

following relevant paragraph from pages 223-224 of the *In re Marra* case:

We have difficulty accepting the distinction urged by appellants that “coating” differs from “impregnating” in this case. It would appear that a porous material like paper would be impregnated to some extent by an aqueous composition applied “by various coating techniques” as Keim et al. suggests, whether the composition is called “coating” or “impregnating.” It seems doubtful that a clearly defined interface between the paper and the coating would result. The differences between coating compositions and impregnating compositions, according to appellants, are in dilution and viscosity. That is, a “coating composition usually has a high-solids content and a relatively high viscosity.” It is clear that none of the claims have any limitations on dilution (solids content) or viscosity. The method claim merely recites “applying” the composition which would appear to include both “coating” and “impregnating,” and there is no evidence that the art recognizes a distinction. Accordingly, we see not justification for concluding that it is unobvious to employ a sizing agent in either a “coating” composition or an “impregnating” composition. (Emphasis added.)

As the above quoted paragraph clearly demonstrates, all that the *In re Marra* case stands for is that the “coating composition” applied to a specific porous material (*i.e.*, paper) would inherently “impregnate” this specific porous material. In fact, Appellants claimed method does not involve “impregnation,” but instead “infiltration” of a very different material (*i.e.*, a porous outer layer of a thermal barrier coating). Nowhere does the Examiner’s Answer properly show how the specific porous material (*i.e.*, paper) of the *In re Marra* case is equivalent to the thermal barrier coatings of the instant Claims. Accordingly, the Examiner’s Answer is making a completely unsupportable generalization from the very specific facts of the *In re Marra* case.

At page 10 of the Examiner’s Answer even agrees with Appellants’ position that Hasz et al. forms an impermeable coating, but then argues that, because Hasz et al. discloses “infiltration or viscous flow of the contaminant compositions into the thermal barrier coating cracks, openings, and pores is prevented,” the thermal barrier coating of Hasz et al. “must necessarily have some amount of porosity.” The Examiner’s Answer then alleges that “since the coating [composition] is applied to a porous material, the coating composition would inherently impregnate, *i.e.*, infiltrate.”

The Examiner’s Answer again improperly engages in unsupported speculation by assuming something that is not taught by Hasz et al. The only material Hasz et al. teaches might “infiltrate” the thermal barrier coating are “liquid contaminant compositions.” That “liquid contaminant compositions” might infiltrate the thermal barrier coating does not

necessarily imply, without more, that the impermeable barrier coating formed to protect against such contaminants, whether deposited from a sol-gel or otherwise, will necessarily infiltrate the thermal barrier coating. Nowhere does Hasz et al. teach that the deposited sol-gel infiltrates the thermal barrier coating as in the claimed method. In fact, nowhere does Hasz et al. teach or suggest that the sol-gel infiltrates the thermal barrier coating as an alumina precursor that is then converted in situ to alumina. See step (3) of Claims 17 and 32. That Hasz et al. forms an impermeable coating without infiltrating the thermal barrier coating is entirely consistent with the teachings of this reference.

In summation, the Examiner's Answer, like the Final Office Action and Advisory Action, are citing the *In re Marra* case completely out of context, and to improperly justify the strained and unsupportable generalization that "coating" and "infiltrating" are somehow art recognized equivalents with regard to the method of Claims 17-25, 27-30, 32-35 and 37.

In fact, as pointed out in Appellants Brief (see page 9), Appellants have previously requested the Examiner to provide an affidavit/declaration under 37 CFR 1.104(d)(2) to support what appears to be a belief based on his own personal knowledge which is not supported by the art relied on. To date, the Examiner has yet to provide the requested affidavit/declaration under 37 CFR 1.104(d)(2) in support of this belief apparently based on his personal knowledge.

In the unpublished case of *In re Sun*, 31 USPQ2d 1451, 1455 (Fed. Cir. 1993), the PTO argued that "the procedures established by 37 C.F.R. Section 1.107(b) (1993) [now 37 CFR § 1.104(d)(2)] *expressly entitle* an applicant, on mere request, to an examiner affidavit that provides [citations that support the Examiner's asserted level of skill in the art]" (emphasis added). Furthermore, in *In re Sun*, the Federal Circuit, held that "this procedure, so readily available, helps save the lack of citation in an office action from possible constitutional infirmity in denying reasonable notice and hence due process." See 31 USPQ2d at 1455. Put differently, the Examiner's failure in the current situation to comply with 37 CFR § 1.104(d)(2) has denied Appellants their statutory rights under the Administrative Procedures Act, as well as their Constitutional rights under the Fifth Amendment, to reasonable notice and due process. Accordingly, the Board is again respectfully requested to give absolutely no weight to this completely unsupported speculation about whether the deposited protective coating of Hasz et al. would "infiltrate" the thermal barrier coating.

3. THE EXAMINER'S ANSWER STILL DOES NOT PROPERLY ADDRESS WHY ONE SKILLED IN THE ART WOULD CONSIDER COMBINING THE TEACHINGS OF HASZ ET AL. WITH THOSE OF SPENCE ET AL. IN VIEW OF THE FACT THAT THESE REFERENCES ADDRESS DIFFERENT PROBLEMS.

As was pointed out in Appellants Brief (see pages 6-8), the Final Office Action improperly combines the teachings of Hasz et al. with those of Spence et al. To properly combine the teachings of Hasz et al. with those of Spence et al., the Final Office Action must allege some proper motivation for one skilled in the art to do so. *See, e.g., In re Fine*, 837 F.2d 1071, 1075, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988) (“teachings of references can be combined only if there is some suggestion or incentive to do so”); *In re Dance*, 160 F.3d 1339, 1343, 48 U.S.P.Q.2d 1635, 1637 (Fed. Cir. 1998) (there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant).

As was also pointed out in Appellants Brief (see pages 7), Spence et al. and Hasz et al. are not directed at protecting against the same or even similar environmental contaminants. As even acknowledged by the Final Office Action and the Advisory Action, Spence et al. is directed at inhibiting carbon deposits (*e.g.*, coke formation) on metallic substrates (see column 1, lines 11-13, and column 3 lines 9-11). By contrast, Hasz et al. is directed at protecting the coating against infiltration of different environmental contaminants, namely CMAS (see column 1, lines 63-67) and iron oxides (see column 2, lines 32-35). Hasz et al makes absolutely no reference to protecting against either “carbon deposits” or “coke formation” as in Spence et al., nor does Spence et al. make any reference to protecting against “CMAS” or “iron oxides” as in Hasz et al.

In response, pages 10-11 of the Examiner’s Answer merely argue that it would be obvious to modify Spence et al. to use a protective coating on a thermal barrier coating as suggested by Hasz et al. “to provide desirable protection from environmental contaminants with a reasonable expectation of success because [Spence et al.] teaches applying an alumina/silicon coating protects various substrates, including ceramic and bond/undercoats applied to metal turbine blades, from a contaminant protective coating in turbine components.” But this alleged basis for combining Hasz et al. with Spence et al. still does not address the fact that these references are directed at protecting against entirely different environmental contaminants. Because Hasz et al and Spence et al. are not directed at the

same problem, there is simply no proper “motivation” for one skilled in the art to combine the teachings of these references.

Like the Advisory Action, page 11 of the Examiner’s Answer cites *In re Merck*, 231 USPQ 375 completely out of context. In the *In re Merck* case, the claimed invention was directed to the use of the drug amitriptyline to treat human mental disorders. This use of amitriptyline was rejected as obvious over references disclosing a structurally closely related drug (imipramine), where the claimed amitriptyline and the disclosed imipramine were both known to be psychotropic drugs. See 231 USPQ at 379. Unlike the situation in *In re Merck*, Spence et al. and Hasz et al. are simply not directed at protecting against the same or even similar environmental contaminants.

In fact, while acknowledging that Appellants have argued that Spence et al. and Hasz et al. are not directed at protecting against the same or similar contaminants, pages 11-12 of the Examiner’s Answer still does not refute Appellants’ argument. Instead, page 12 of the Examiner’s Answer argues that Spence et al. and Hasz et al. are “relevant art because they both teach of protecting turbine engine arts from contaminants.” The Examiner’s Answer misses the point that “relevancy” is not the standard, but rather “motivation to combine” is. Using the logic of the Examiner’s Answer, multiple references could be combined simply on the basis that those references “are relevant” in teaching “protecting turbine engine parts from contaminants,” no matter how different those contaminants might be. In view of the controlling case law of *In re Fine* and *In re Dance*, such flawed logic does not properly articulate a “motivation to combine” the teachings of Hasz et al. with those of Spence et al. relative to the method of Claims 17-25, 27-30, 32-35 and 37.

4. EVEN IF PROPERLY COMBINABLE WITH SPENCE ET AL., THE EXAMINER’S ANSWER STILL FAILS TO PROPERLY ADDRESS HOW HASZ ET AL. FACTUALLY TEACHES OR SUGGESTS THAT THE DEPOSITED COATING INFILTRATES THE THERMAL BARRIER COATING.

As was pointed out in Appellants Brief (see pages 8-10), even if properly combinable with Spence et al., Hasz et al. still fails to teach or suggest infiltrating the porous outer layer of a thermal barrier coating with an alumina precursor according to the method of Claims 17-25, 27-30, 32-35 and 37. The benefit suggested by Hasz et al. for their impermeable coating appears to be to prevent any flow of contaminants into the underlying thermal barrier coating. By contrast, infiltrating and then converting alumina in situ within the porous outer layer

according to the instant Claims provides a reservoir of infiltrated alumina that can react with the contaminants to form a phase with a higher melting point. This alumina reservoir thus “freezes” the contaminants and does not permit these “frozen” contaminants to further penetrate into the thermal barrier coating, nor go through cyclic liquid-solid-liquid phase transformations that can undesirably stress and crack the thermal barrier coating. Such a benefit is not taught at all by Hasz et al., or Spence et al.

In response, pages 12-13 of the Examiner’s Answer alleges that the instant Claims “utilize open language and are therefore open to other steps” and that the instant Claims “are not limited to including only reservoirs of alumina which ‘freeze’ the contaminants and only requires in situ thermal conversion of the infiltrated alumina.” Page 13 of the Examiner’s Answer further alleges that “the coating composition, as taught by Spence [et al.] is an aqueous solution, and Hasz [et al.] teaches a liquid solution infiltrates the pores of the TBC, the coating material must necessarily infiltrate to some degree and Spence [et al.] discloses after coating thermal conversion, which clearly converts the infiltrated alumina in situ.”

To the contrary, neither Spence et al., nor Hasz et al., teach or suggest that their respective surface/component or thermal barrier coating are in anyway infiltrated by the respective applied coatings. In fact, and as was pointed out in Appellants Brief (see page 9), Spence et al. and Hasz et al. would suggest just the opposite. Each of these references teaches a separate coating layer on top of the respective surface/component or thermal barrier coating. In other words, Spence et al. and Hasz et al. would suggest that there is a clearly defined “interface” between the applied coating of these references, and the respective surface/component or thermal barrier coating.

In response, page 13 of the Examiner’s Answer argues that the Examiner “cannot locate such a statement in either Hasz [et al.] or Spence [et al.] to illustrate such a defined interface, therefore such an argument must be deemed mere attorney speculation unsupported by factual evidence.” But if the “interface” between the applied coatings of Spence et al. and Hasz et al. and the respective surface/component or thermal barrier coating is “speculative,” then the position in the Examiner’s Answer that the deposited coating of Hasz et al. necessarily “infiltrates” the thermal barrier coating is at least as “speculative” and unsupported by the teachings in Hasz et al. To say, as the Examiner’s Answer does at page 13 that “Hasz et al. clearly discloses a TBC with pores, cracks, etc., which are capable of being infiltrated by a liquid or gas” does not factually support that the deposited coating of Hasz et

al. must necessarily “infiltrate” the thermal barrier coating.

Like the Final Office Action and the Advisory Action, pages 13-14 of the Examiner’s Answer allege that Appellants rely on a feature (reservoir of alumina to react with the contaminants) that is not recited in the Claims, and again cites *In re Van Geuns*, 26 USPQ2d 1057 (Fed. Cir. 1993) for the proposition that “limitations from the specification are not read into the claims.” The reliance of the Examiner’s Answer on the *In re Van Geuns* case is misplaced. In the *In re Van Geuns* case, the applicant argued that the art did not make the claimed “uniform magnetic field” limitation obvious because this art did not teach a level of magnetic field uniformity required for NMR imaging. The Federal Circuit responded that the claim was not expressly limited to NMR or MRI apparatus.

By contrast, the method of Claims 17-25, 27-30, 32-35 and 37 specifically recites that the infiltrated alumina precursor should be “in an amount sufficient to provide, when converted to alumina, at least partial protection of the thermal barrier coating against environmental contaminants that become deposited on the exposed surface.” See step (2) of Claims 17 and 30. In other words, this claimed amount of infiltrated alumina present within the porous outer layer is the “reservoir” of alumina. What Appellants have pointed out is simply the inherent benefit of having this claimed amount of infiltrated alumina present within the porous outer layer. See paragraph [0033] at page 14 of the above application where the benefit of this claimed amount of infiltrated alumina is described.

In response, page 14 of the Examiner’s Answer alleges that it “cannot locate any language in the claim to limit the amount to a reservoir of alumina” and that “the claim language is clearly open to a coating on the TBC to protect the TBC against any contaminants that are deposited on the exposed surface.” But in fact, the Examiner’s Answer is reading the instant Claims (see, for example, Claims 17 and 30) completely out of context. The only “amount” of alumina that is referenced in the instant Claims for “protection of the thermal barrier coating against environmental contaminants that become deposited on the exposed surface” is the alumina converted from the infiltrated alumina precursor within the porous outer layer of the thermal barrier coating.

5. GIVEN THAT SPENCE ET AL., EVEN IN VIEW OF HASZ ET AL., DOES NOT TEACH THE CLAIMED PERIOD OF TIME FOR TREATING THE OUTER LAYER ACCORDING TO CLAIMS 29-30, THE EXAMINER'S ANSWER STILL FAILS TO PROPERLY ADDRESS HOW THESE REFERENCES CAN POSSIBLY SUGGEST THIS CLAIMED PERIOD OF TIME.

As was pointed out in Appellants Brief (see pages 10-11), in rejecting Claims 29-30, the Final Office Action, as well as the Advisory Action, concedes that Spence et al., even in view of Hasz et al., fails to teach the claimed period of time for treating the outer layer. Like the Final Office Action and the Advisory Action, pages 14-15 of the Examiner's Answer asserts, without any support from the art relied on, that the "length of treatment" is "a result effective variable," and that it would be obvious "to optimize such treatment length to insure proper coating thickness." Again, the Examiner's Answer engages in unsupportable and improper speculation. The cited case law (*In re Boesch*) regarding selecting "optimum values" is irrelevant because, as even the Final Office Action, Advisory Action, and now Examiner's Answer concede, no time periods are taught by the art relied on. The Examiner's Answer still alleges no proper basis for rejecting Claims 29-30 under 35 U.S.C. § 103(a) as unpatentable over Spence et al. in view of Hasz et al.

In fact, as pointed out in Appellants Brief (see pages 10-11), Appellants have previously requested the Examiner to provide an affidavit/declaration under 37 CFR 1.104(d)(2) to support what appears to be a belief based on his own personal knowledge which is not supported by the art relied on. To date, the Examiner has yet to provide the requested affidavit/declaration under 37 CFR 1.104(d)(2) in support of this belief apparently based on his personal knowledge. As held in the case of *In re Sun*, Appellants are entitled to such an affidavit/declaration under 37 CFR 1.104(d)(2) by merely requesting it such that the failure to provide such an affidavit/declaration amounts to a denial of notice and due process. Accordingly, the Board is respectfully requested to give absolutely no weight to this completely unsupported speculation about the alleged "obviousness" of the time periods defined in Claims 29-30.

6. THE EXAMINER'S ANSWER STILL DOES NOT PROPERLY IDENTIFY WHAT "COMPONENT" IN SPENCE ET AL. OR HASZ ET AL. IS IN AN ASSEMBLED STATE ACCORDING TO CLAIMS 32-35 AND 37.

As was pointed out in Appellants Brief (see page 11), in rejecting Claims 32-35 and 37 as unpatentable over Spence et al., in view of Hasz et al., the Final Office Action violates 37 CFR 1.104(c)(2). As Appellants have repeatedly pointed out, none of the Office Actions, including the Final Office Action and Advisory Action, specifically identify where Spence et al. or Hasz et al. teach or suggest a turbine component that is in an assembled state when the porous outer layer is treated with the liquid composition according to Claims 32-35 and 37.

In response, page 15 of the Examiner's Answer, like the Final Office Action and the Advisory Action, simply allege that the component taught by Spence et al. is "clearly" in an "assembled state" "where such term is given its broadest reasonable interpretation" and that the turbine components of Spence et al. and Hasz et al. "would necessarily be assembled." But the Examiner's Answer, like the Final Office Action and the Advisory Action, still fails to specifically identify what "component" in Spence et al. and Hasz et al. is referred to as being in an "assembled state." The suggestion in the Examiner's Answer that "turbine parts are assembled to a degree prior to coating" to the extent that a "substrate" can be an "assembled component" is simply unreasonable speculation, and not supported by either Spence et al. and Hasz et al., especially since the Examiner's Answer still refuses to specifically identify what "component" in Spence et al. and Hasz et al. is referred to as being in an "assembled state."

B. REJECTION OF CLAIMS 26 AND 36 UNDER 35 U.S.C. § 103(a) AS UNPATENTABLE OVER SPENCE ET AL., IN VIEW OF HASZ ET AL., AND FURTHER IN VIEW OF CERAMICS AND GLASSES

There is basically one point presented at pages 15-16 of Section 10 of the Examiner's Answer that necessitates an additional response by Appellants regarding the rejection of Claims 26 and 36 under 35 USC § 103(a) as unpatentable over Spence et al., in view of Hasz et al., and further in view of Ceramics and Glasses. This point relates to: (1) Appellants position that Ceramics and Glasses does not teach or suggest that the alpha alumina formed would be finely divided, as defined in Claims 26 and 36.

1. THE EXAMINER'S ANSWER STILL DOES NOT PROPERLY ALLEGE HOW CERAMICS AND GLASSES TEACHES OR SUGGESTS THAT THE ALPHA ALUMINA FORMED WOULD BE FINELY DIVIDED, AS DEFINED IN CLAIMS 26 AND 36.

As was pointed out in Appellants Brief (see page 12), Ceramics and Glasses does not teach or suggest that the alpha alumina formed would be finely divided, as defined in Claims 26 and 36. In fact, the Final Office Action, as well as the Advisory Action, fails to even address *where* Ceramics and Glasses teaches or suggests that the alpha alumina formed would be finely divided.

In response, pages 15-16 of the Examiner's Answer, like the Final Office Action and the Advisory Action, instead suggests that the aluminum alkoxide thermally converted to alpha alumina "must necessarily result in finely divided alpha alumina." As pointed out in Appellants Brief, this suggestion improperly relies on what the above application teaches, and not what Ceramics and Glasses or any of the other art relied on teaches. Without any support in the art relied on, the Examiner's Answer, like the Final Office Action and the Advisory Action, incorrectly and improperly suggests that either: (1) the above application and the art have different definitions for alpha alumina thermally converted from aluminum alkoxide; or (2) Claims 26 and 36 are using other processing steps or parameters that are not in these Claims.

In fact, as pointed out in Appellants Brief (see page 12), Appellants have previously requested that the Examiner to provide an affidavit/declaration under 37 CFR 1.104(d)(2) to support what appears to be a belief based on his own personal knowledge which is not supported by the art relied on. Like the Final Office Action, the Examiner's Answer says that this requested affidavit/declaration under 37 CFR 1.104(d)(2) is "not necessary," but nonetheless still relies on a belief based on his own personal knowledge which is not supported by the art relied on. To date, the Examiner has yet to provide the requested affidavit/declaration under 37 CFR 1.104(d)(2) in support of this belief apparently based on his personal knowledge. As held in the case of *In re Sun*, Appellants are entitled to such an affidavit/declaration under 37 CFR 1.104(d)(2) by merely requesting it such that the failure to provide such an affidavit/declaration amounts to a denial of notice and due process. Accordingly, the Board is respectfully requested to give absolutely no weight to this completely unsupported belief as to whether aluminum alkoxide thermally converted to alpha alumina must necessarily result in "finely divided" alpha alumina.

**C. REJECTION OF CLAIMS 32 AND 38 UNDER 35 U.S.C. § 103(a) AS UNPATENTABLE
OVER RIGNEY ET AL., IN VIEW OF SPENCE ET AL. AND IN VIEW OF HASZ ET AL.**

There are basically two points presented at pages 16-17 of Section 10 of the Examiner's Answer that necessitate an additional response by Appellants regarding the rejection of Claims 32 and 38 under 35 USC § 103(a) as unpatentable over Rigney et al., in view of Spence et al and in view of Hasz et al. These points relate to: (1) Appellants position that no proper motivation has been alleged for combining the teachings of Spence et al. and Hasz et al. with those of Rigney et al based on what Rigney et al. teaches; and (2) Appellants position that the relevance of Rigney et al. to Claim 32 is never explained in the Final Office Action.

**1. THE EXAMINER'S ANSWER STILL ALLEGES NO PROPER MOTIVATION FOR
COMBINING THE TEACHINGS OF SPENCE ET AL. AND HASZ ET AL. WITH THOSE
OF RIGNEY ET AL. BASED ON WHAT RIGNEY ET AL. TEACHES.**

As was pointed out in Appellants Brief (see pages 13-14), the Final Office Action has improperly combined the teachings of Spence et al. and Hasz et al. with those of Rigney et al. Specifically, the Final Office Action (and the Advisory Action) fail to allege any proper basis for why one skilled in the art would be motivated to use alumina in the repair process of Rigney et al. based on what Rigney et al. would suggest. The motivation put forth by the Final Office Action and the Advisory Action for using alumina in the Rigney et al. repair process is based on what Spence et al. and Hasz et al. allegedly desire for a protective coating for a component, and not what the primary reference, Rigney et al., would suggest to one skilled in the art would be a desirable material for repairing a damaged section of a coating.

In fact, as was also pointed out in Appellants Brief (see page 14), Rigney et al. suggests a distinct preference for a different type of coating for its repair process, namely a diffusion aluminide coating or an overlay coating (metallic coatings), neither of which is the same or similar to the claimed alumina (a ceramic). See column 3, lines 50-58 of Rigney et al. Why one skilled in the art would be motivated to select alumina (a ceramic) over these other metallic coating materials taught for use in the Rigney et al repair process for the purposes set forth by Rigney et al. is never addressed by the Final Office Action or the Advisory Action.

Pages 16-17 of the Examiner's Answer, for all their rhetoric, still do not properly

address why one skilled in the art would be motivated to use alumina in the repair process of Rigney et al. based on what Rigney et al. would suggest. Like the Final Office Action and the Advisory Action, the motivation put forth in the Examiner's Answer is based on what Spence et al. and Hasz et al. allegedly desire for a protective coating for a component, and not what the primary reference, Rigney et al., would suggest to one skilled in the art would be a desirable material for repairing a damaged section of a coating. In response to the Appellants' position that Rigney et al. suggests a distinct preference for a different type of coating for its repair process, the Examiner's Answer makes the conclusory statement that Rigney et al. "clearly discloses providing a repair with an outer TBC and taking the references collectively one would be motivated to modify Rigney [et al.] to apply the protective coating to the thermal barrier coating of a refurbished component as suggested by Spence [et al.] in view of Hasz [et al.] to provide a desirable protection of a thermal barrier coating for a turbine component." This conclusory statement nowhere properly addresses Appellants' position why one skilled in the art would be motivated to select alumina (a ceramic) according to Appellants' claimed method over the different metallic coating materials taught for use in the Rigney et al repair process for the purposes set forth by Rigney et al.

2. THE EXAMINER'S ANSWER STILL DOES NOT EXPLAIN THE RELEVANCE OF RIGNEY ET AL. TO CLAIM 32.

As was pointed out in Appellants Brief (see page 15), Appellants remain puzzled as to why Claim 32 has been rejected over Rigney et al., in view of Spence et al., and in view of Hasz et al. Only Claim 38, not Claim 32, specifically defines step (1) as providing a refurbished thermal barrier coating that overlays the metal substrate of the turbine component. Indeed, the relevance of Rigney et al. to Claim 32 is never explained in the Final Office Action.

The Examiner's Answer still does not explain the relevance of Rigney et al. to Claim 32. Accordingly, Appellants respectfully request that the Board deem the rejection of Claim 32 over Rigney et al., in view of Spence et al and in view of Hasz et al., to be improper, and respectfully request that this rejection of Claim 32 be withdrawn.

SUMMARY OF ARGUMENT AND RELIEF REQUESTED

Based on the arguments presented in Appellants Brief and the present Reply Brief, it is respectfully submitted that the method of Claims 17-30 and 32-38 is unobvious over the prior

art relied on in rejecting these Claims. Accordingly, Appellants respectfully request the Honorable Board of Appeals and Interferences to reverse the Examiner's rejections in the Final Office Action and remand with directions to allow the above application to issue with Claims 17-30 and 32-38 currently pending.

Respectfully submitted,
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